

**AYK Region
Norton Sound
Salmon Escapement
Report # 47**

1986 North River Salmon Counting Tower

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Division of Commercial Fisheries
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North River Tower

INTRODUCTION

The North River is the largest tributary to the Unalakleet River, and is one of the most important salmon producing rivers in Norton Sound. In 1984 a salmon counting tower was re-established on the North River near the 1973 tower site (Figure 1). During 1972 through 1974 a counting tower operated within 400 yards of the North River bridge. (Regnart, R.I. and L.L. Trasky, 1973., Cunningham, 1973, 1974, 1975.). The tower was discontinued after the 1974 season due to the small chum run on the North River and its lack of commercial importance as a chum salmon producing stream. During the past ten years, both the price and run size of the chinook and coho runs have increased. The even year cycle of pink salmon has also increased dramatically. The increasing commercial importance of the chinook and coho salmon returns to the Unalakleet subdistrict resulted in the re-establishment of the North River tower (Lean, 1985, 1986).

The North River tower provides the management biologist with information on the daily and seasonal timing and magnitude of the salmon escapement. The North River tower counts are also compared with test fishing results and aerial survey data as a means of providing an abundance index to the total Unalakleet River returns.

METHODS

Tower Counts

A 20 foot tower was erected on the east bank of the North River using aluminum scaffolding. The feet of the tower were nailed to two planks which were blocked with wood and sand bags to provide a firm foundation. Two more planks were laid across the lowest rungs of the scaffolding where sand bags were stacked to provide a low center of gravity for the tower. One-quarter inch air-craft cable was used for guy wires and anchored to the bases of large alder bushes.

A 40 foot long weir made of fence posts and cattle fencing was placed on the opposite shore to deflect salmon closer to the tower.

A flash panel, 50 feet x 5 feet, was placed between the weir and the cut bank under the tower. The panel was tied at one foot intervals to an air craft cable running on the river bottom between fence post anchors.

Lighting during dark hours was provided using a car headlight set inside a 5 gallon can. The beam was placed angling slightly downstream and across the flash panel. Car batteries used to power the light were charged during the day using a generator.

The two person tower crew counted 18 half hour counts per day starting at Noon and ending at 6:00 a.m., except on Wednesday when 24 half-hour counts were made and Sundays which were days off. Weather and camp set-up caused some counts to be missed primarily during the first week of the season.

Counting began on June 25 and continued until project funding was terminated on July 18. The original operational plan called for the project to terminate July 31 for a more complete index of salmon migration. Daily counts were radioed to Unalakleet and relayed to Nome. After the field season, missing hourly counts were interpolated by averaging the same hourly counts for the preceding and following day.

Aerial Surveys

No aerial surveys were flown on the North River during 1986 but two surveys were flown on the main Unalakleet River. The first survey covered the lowest five miles on June 20. The second survey included the stretch of river from the mink farm upstream including Old Woman River on July 28. The survey continued until no more salmon were seen.

Weather precluded coho salmon surveys over all of Norton Sound.

RESULTS

Tower Counts

The final expanded counts are 1,613 chinook, 236,487 pink and 3,738 chum salmon.

Tables 1, 2, and 3 present the hourly expanded counts of chinook, pink and chum salmon past the North River Tower. Appendix Tables 1, 2, and 3 show the historic tower counts by species during the years the tower has been operated.

Aerial Surveys

The aerial survey of the lower Unalakleet River flown on June 20 observed no salmon. The survey of the upper river on July 28 counted a total of 382 chinook, 15 pink, and 1,296 chum salmon. The survey of the Old Woman River accounted for 71 chinook, 0 pink and 810 chum salmon from the total count.

Appendix Table 4 summarizes the historical peak aerial surveys from the North River.

DISCUSSION

For a third consecutive year the early portion of the salmon migration was compressed due to a late spring breakup. This caused the pink salmon to begin migrating before the chinook salmon. When the project ceased operation over 95% of pink salmon escapement appeared to have passed the tower (Figure 4). By comparison, the chum and chinook salmon migration was less complete when counts were terminated (Figures 2 and 3). Salmon escapements appears to have at least approached the goal of 2,000 for chinook salmon and exceeded the chum salmon goal of 2,500 based on the likelihood of additional escapement after counts terminated. Although there is no escapement goal for pink salmon on the North River the 1986 pink salmon counts appear to be the third highest escapement recorded on this river and are probably adequate.

Literature Cited

Regnart, R.I. and L.L. Trasky. Norton Sound Anadromous Fish Investigation, Unalakleet Area 1972. AYK Region, Fisheries Bulletin No. 18. April 1973. 33pp. In Nome office files.

Cunningham, P. North River Salmon Counting Tower, 1972-1973. AYK Region NS/K Escapement Report No. 11. (from AYK Area Arctic Anadromous Fish Investigations) p.7-39. In Nome office files.

Cunningham, P.B. Arctic Anadromous Fish Investigations Technical Report, July 1, 1974 to June 30, 1975. AYK region, NS/K State/Fed Report No. 3. December 1975. 28pp. In Nome office files.

Lean, C.F. 1984 North River Salmon Counting Tower. AYK Region, NS Escapement Report #34. March 1985. 17pp. In Nome office files.

_____. 1985 North River Salmon Counting Tower. AYK Region, NS Escapement Report # _____. January 1986. 20pp. In Nome office files.

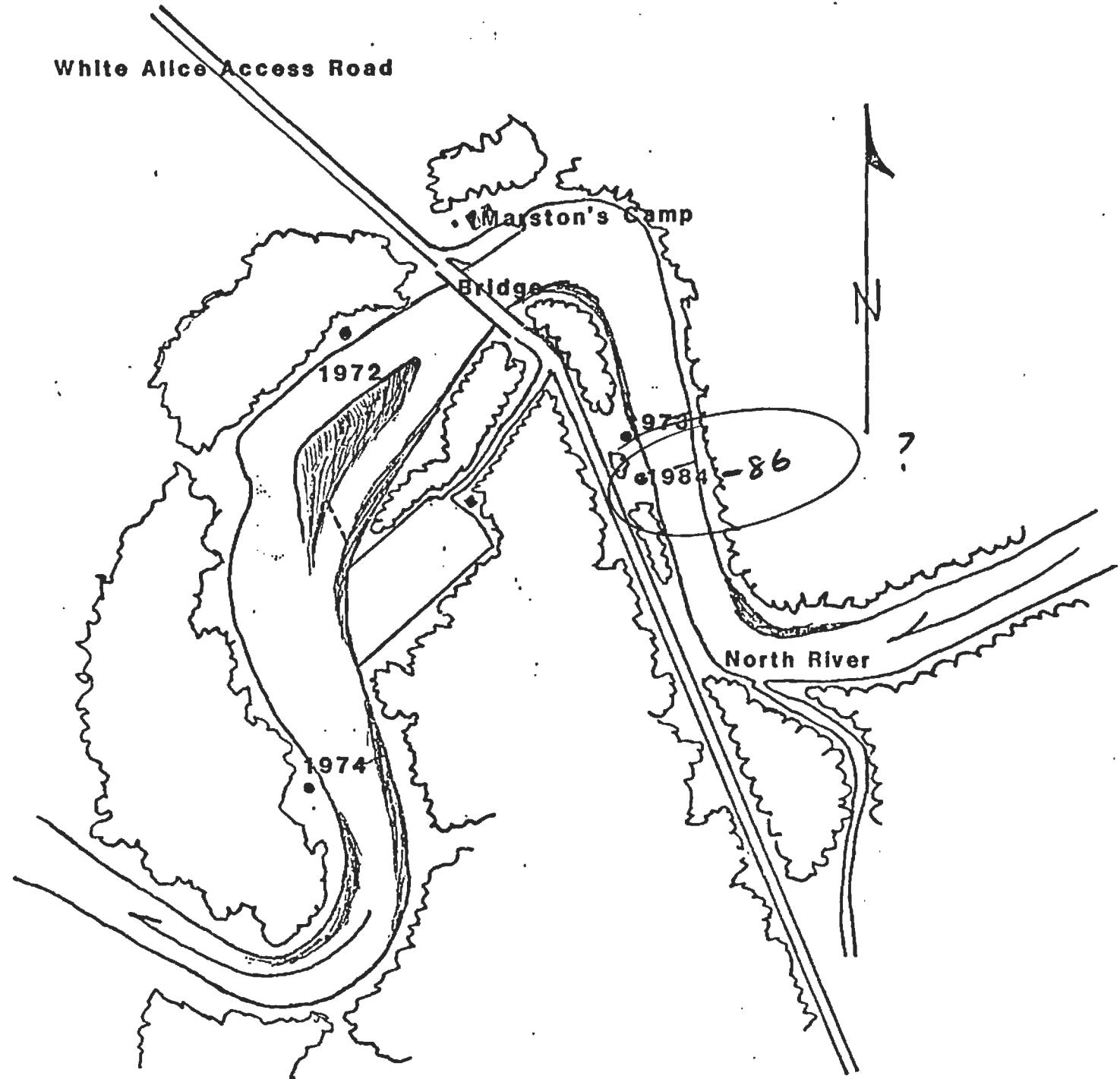


Figure 1. Locations of the North River Counting Towers.

Figure 2. 1986 North River
cumulative expanded salmon counts/day.

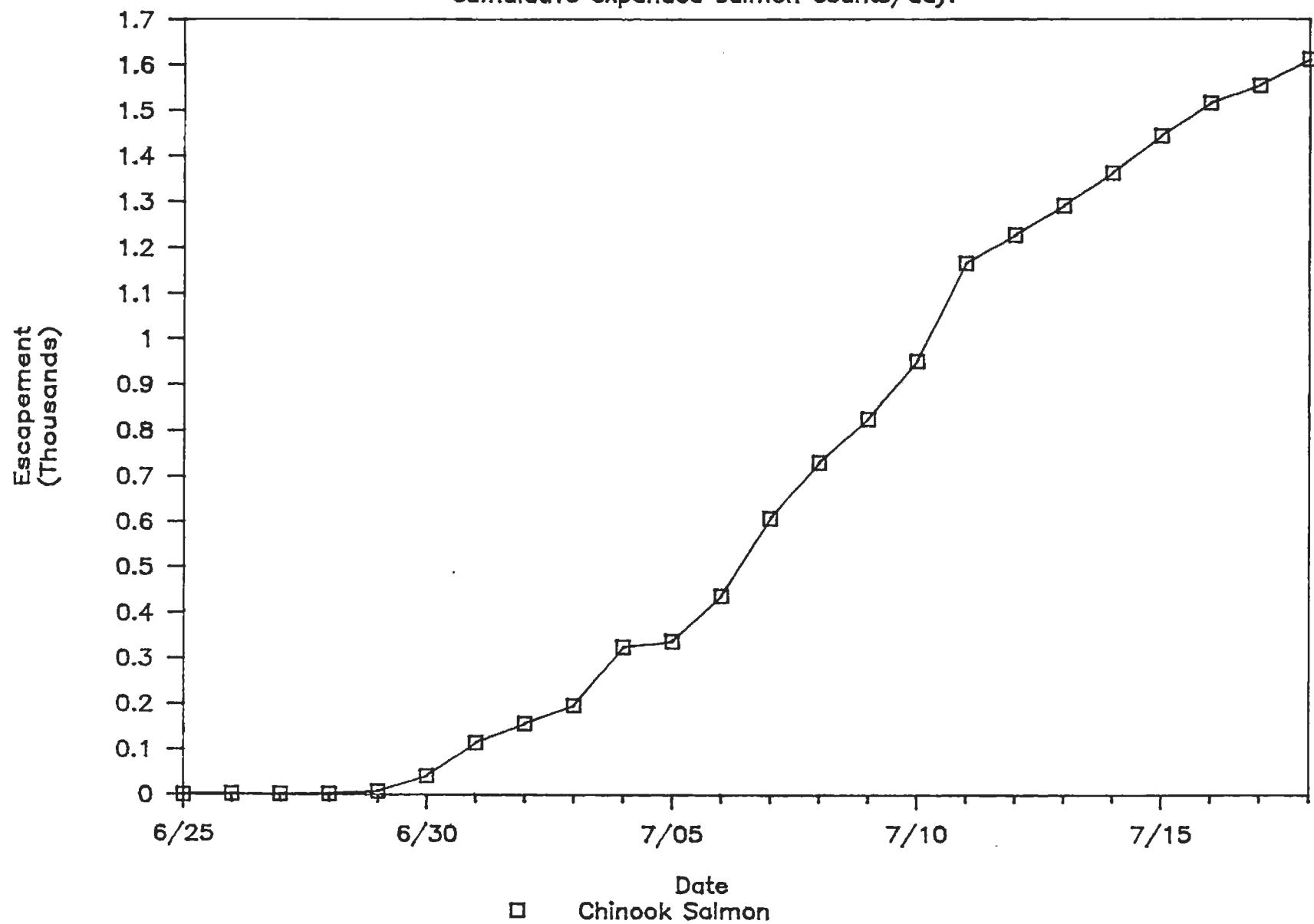


Figure 3. 1986 North River
cumulative expanded salmon counts/day.

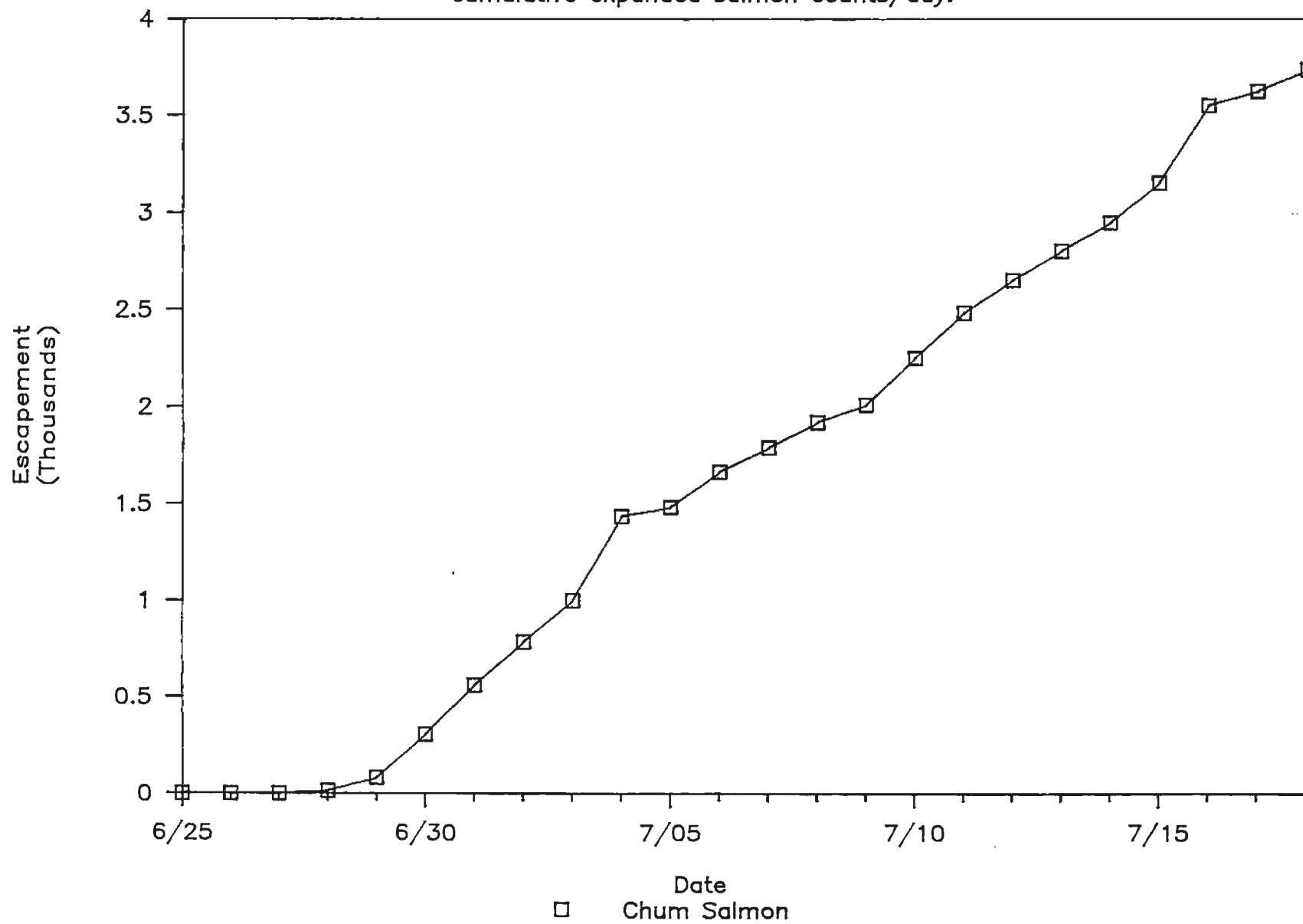


Figure 4. 1986 North River

cumulative expanded salmon counts/day.

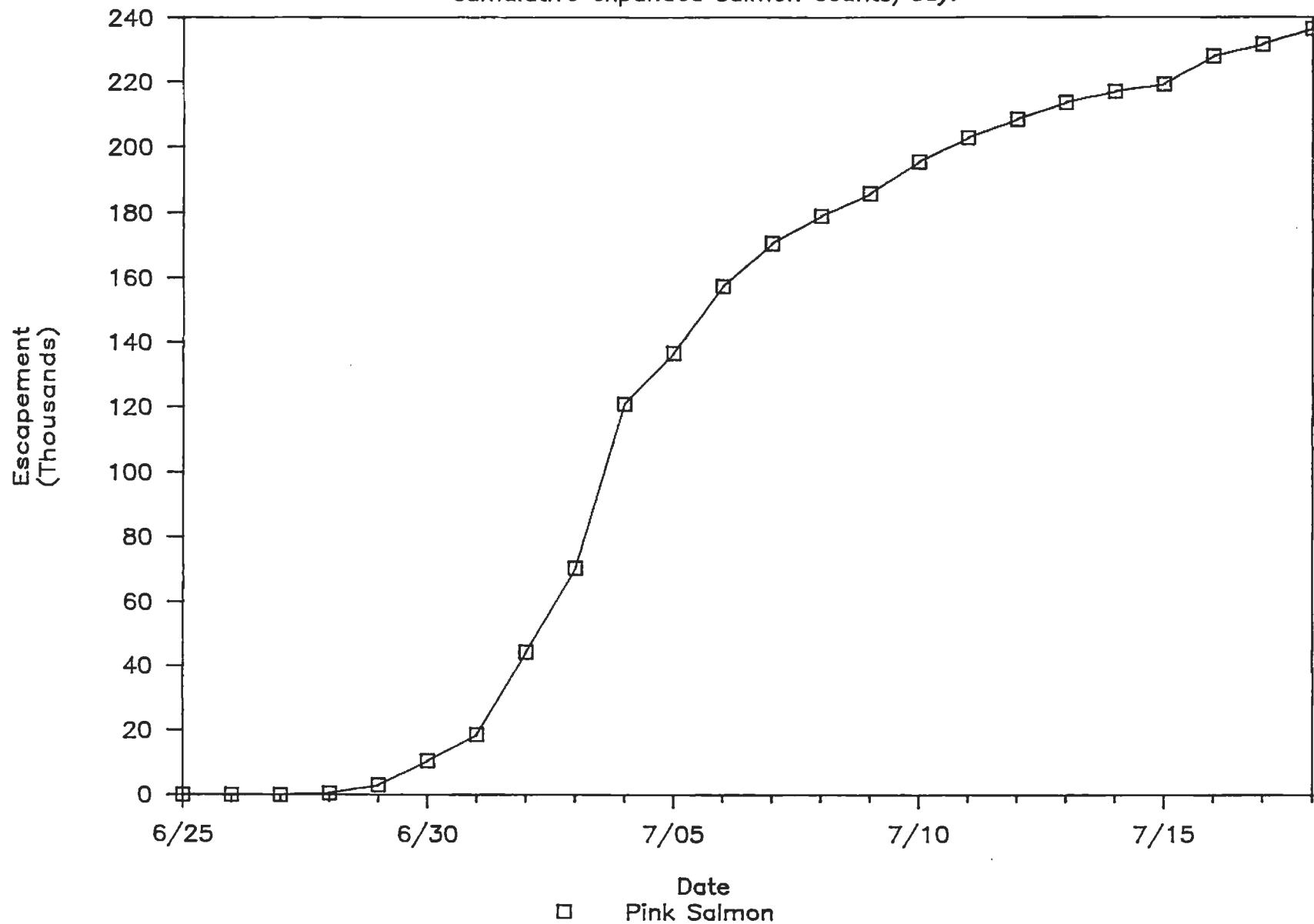


Table 1. Expanded daily hourly migration past North River counting tower, Chinook salmon, 1986.

DATE	HOUR	CUM. TOTAL																							
		0000	0100	0200	0300	0400	0500	6-12	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	TOTAL	%	CUM. TOTAL		
6/25																									
6/26																									
6/27																									
6/28																									
6/29	0	0	0	0	0	0	0	*0																	
6/30	*2	*0	*3	*3	*10	*4	*0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.37	8
7/01	4	0	6	6	20	8	*0		0	0	0	4	6	0	0	0	6	0	2	12	34	2.11	.42		
7/02	4	16	16	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	2	42	2.60	158		
7/03	4	10	2	8	0	8	*0		0	0	0	-2	2	2	0	0	4	0	0	2	40	2.48	198		
7/04	8	6	8	4	12	0	*0		4	4	0	0	8	8	22	6	22	0	4	12	128	7.94	326		
7/05	2	4	0	4	4	-4	*0		2	0	0	0	0	0	0	0	0	0	0	0	12	0.74	338		
7/06	6	0	0	6	4	2	*46		*8	*8	*2	*1	*3	*2	*2	*4	*0	*0	*5	*1	100	6.18	438		
7/07	*3	*2	*6	*5	*2	*5	*79		14	16	4	2	6	4	4	8	0	0	10	2	172	10.65	609		
7/08	0	4	12	4	0	8	*56		2	2	2	4	2	0	0	2	0	6	0	18	122	7.55	731		
7/09	0	18	6	12	4	10	44	0	0	0	0	0	0	0	0	2	0	0	0	0	96	5.95	827		
7/10	6	8	4	6	4	16	*58	2	2	2	6	-4	-2	4	4	2	2	0	6	126	7.78	953			
7/11	6	10	10	8	-2	4	*98	8	14	-2	2	10	8	6	8	18	2	6	0	214	13.28	1167			
7/12	4	4	4	2	2	4	*9	0	-2	6	4	6	4	2	2	2	8	0	2	63	3.89	1230			
7/13	0	6	0	4	6	4	*9	*2	(*)1	*6	*3	*3	*2	*1	*1	*2	*6	*7	*3	64	3.96	1294			
7/14	*0	*3	*10	*2	*4	*6	*10	4	0	6	2	0	0	0	0	2	4	14	4	71	4.39	1364			
7/15	0	0	20	0	2	8	*11	0	0	4	8	6	0	4	2	0	4	12	0	81	5.04	1446			
7/16	2	-2	2	0	4	4	10	4	12	2	10	-2	0	2	10	10	4	0	0	72	4.46	1518			
7/17	8	0	2	2	0	2	*5	0	6	2	2	0	0	2	2	0	4	8	-6	39	2.45	1557			
7/18	6	-2	0	0	2	4	*8	0	2	6	0	2	0	8	14	0	4	4	-2	56	3.46	1613			
TOTAL	65	87	111	76	78	93	\$442	50	63	40	46	48	30	57	67	68	44	72	76	1613	100				
%	4.03	5.39	6.88	4.71	4.84	5.77	27.40	3.10	3.91	2.48	2.85	2.98	1.86	3.53	4.15	4.22	2.73	4.46	4.71	100	1613				

Note: * denotes interpolated value.
- denotes downstream counts.

Table 2. Expanded daily hourly migration past North River counting tower, Pink salmon, 1986.

DATE	HOUR																				CUM. TOTAL	
	0000	0100	0200	0300	0400	0500	6-12	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	TOTAL	%	TOTAL
6/25																				0	0.00	0
6/26																				0	0.01	20
6/27																				0	0.01	42
6/28																				0	0.01	542
6/29	208	122	16	32	104	34	*11	*5	*3	*1	*5	*5	*80	*12	*49	*295	*93	*370	*1,175	2620	1.11	3162
6/30	*550	*1,518	*741	*578	*247	*132	*32	8	2	2	10	10	158	24	92	590	104	528	2160	7486	3.17	10648
7/01	892	2914	1466	1124	390	230	*34	8	20	10	4	8	12	6	54	138	58	78	590	8036	3.40	18685
7/02	2838	12386	4644	1302	300	36	110	6	4	12	8	4	14	184	44	92	402	1492	1772	25650	10.85	44335
7/03	2868	3546	3494	1240	594	584	*112	0	6	6	1180	1016	780	1068	1864	2396	2	1466	4010	26232	11.09	70567
7/04	5240	4790	2542	2032	1088	716	*216	2382	1158	972	132	4630	8984	5140	2818	3170	2342	892	1096	50340	21.29	120907
7/05	1688	934	1100	874	404	382	*68	302	526	336	466	612	696	314	726	466	540	512	4874	15820	6.69	136727
7/06	3202	2430	1732	1648	1372	694	*1,461	*442	*610	*419	*387	*560	*483	*359	*600	*479	*456	*804	*2,651	20789	8.79	157516
7/07	*1,785	*1,420	*948	*898	*728	*376	*929	582	694	502	308	508	270	404	474	492	372	1096	428	13214	5.59	170730
7/08	368	410	164	148	84	58	*587	118	108	80	156	242	224	280	574	614	1284	2874	780	8353	3.53	179083
7/09	684	756	696	308	192	148	480	72	114	202	168	140	648	400	390	412	254	356	410	6830	2.89	185913
7/10	850	724	1124	1004	992	390	*672	54	32	38	304	466	306	298	468	402	464	194	774	9556	4.04	195468
7/11	1396	1118	444	296	136	110	*525	60	148	132	104	120	210	160	154	1220	670	394	7475	3.16	202944	
7/12	400	112	232	378	250	80	*397	-56	108	52	132	126	58	822	298	548	378	778	560	5653	2.39	208597
7/13	1024	464	90	82	22	-74	*789	(*)	*62	*56	*99	*120	*125	*485	*179	*447	*336	*504	*380	5188	2.16	213705
7/14	*661	*268	*70	*73	*56	*22	*472	52	16	60	66	114	192	148	60	346	294	230	200	3400	1.44	217106
7/15	298	72	50	64	90	118	*312	42	44	66	106	102	94	180	180	138	126	84	82	2248	0.95	219354
7/16	116	138	170	212	168	170	1224	350	710	226	680	252	122	356	824	1486	566	672	372	8814	3.73	228168
7/17	230	338	218	220	222	90	*504	120	50	104	28	26	6	114	216	380	322	202	240	3630	1.54	231798
7/18	742	392	328	176	250	282	*651	12	16	120	66	100	80	88	196	400	360	180	250	4689	1.98	236487
TOTAL	26040	34852	20269	12689	7689	4578	9508	4564	4438	3402	4413	9161	13548	10844	10266	14511	9505	13122	23088	236487	100	
%	11.01	14.74	8.57	5.37	3.25	1.94	4.02	1.93	1.88	1.44	1.87	3.87	5.73	4.59	4.34	6.14	4.02	5.55	9.76	100	236487	

Note: * denotes interpolated value.
 _ denotes downstream counts.

Table 1. Expanded daily hourly migration past North River counting tower, Chinook salmon, 1986.

DATE	HOUR	CUM. TOTAL																						
		0000	0100	0200	0300	0400	0500	6-12	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	TOTAL	%	CUM. TOTAL	
6/25																					0	0	0	
6/26																					2	2	0.12	2
6/27									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	2
6/28																					0	0	0.00	2
6/29	0	0	0	0	0	0	0	*0													*6	6	0.37	8
6/30	*2	*0	*3	*3	*10	*4	*0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	34	2.11	42
7/01	4	0	6	6	20	8	*0	0	0	0	0	4	6	0	0	0	6	0	2	12	74	4.59	116	
7/02	4	16	16	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	42	2.60	158	
7/03	4	10	2	8	0	8	*0	0	0	0	-2	2	2	0	0	4	0	0	0	2	40	2.48	198	
7/04	8	6	8	4	12	0	*0	4	4	0	0	8	8	22	6	22	0	4	12	128	7.94	326		
7/05	2	4	0	4	4	-4	*0	2	0	0	0	0	0	0	0	0	0	0	0	12	0.74	338		
7/06	6	0	0	6	4	2	*46	*8	*8	*2	*1	*3	*2	*2	*4	*0	*0	*5	*1	100	6.18	438		
7/07	*3	*2	*6	*5	*2	*5	*79	14	16	4	2	6	4	4	8	0	0	10	2	172	10.65	609		
7/08	0	4	12	4	0	8	*56	2	2	2	4	2	0	0	2	0	6	0	18	122	7.55	731		
7/09	0	18	6	12	4	10	44	0	0	0	0	0	0	0	2	0	0	0	0	96	5.95	827		
7/10	6	8	4	6	4	16	*58	2	2	2	6	-4	-2	4	4	2	2	0	6	126	7.78	953		
7/11	6	10	10	8	-2	4	*98	8	14	-2	2	10	8	6	8	18	2	6	0	214	13.28	1167		
7/12	4	4	4	2	2	4	*9	0	-2	6	4	6	4	2	2	2	8	0	2	63	3.89	1230		
7/13	0	6	0	4	6	4	*9	*2	(*1)	*6	*3	*3	*2	*1	*1	*2	*6	*7	*3	64	3.96	1294		
7/14	*0	*3	*10	*2	*4	*6	*10	4	0	6	2	0	0	0	0	2	4	14	4	71	4.39	1364		
7/15	0	0	20	0	2	8	*11	0	0	4	8	6	0	4	2	0	4	12	0	81	5.04	1446		
7/16	2	-2	2	0	4	4	10	4	12	2	10	-2	0	2	10	10	4	0	0	72	4.46	1518		
7/17	8	0	2	2	0	2	*5	0	6	2	2	0	0	2	2	0	4	8	-6	39	2.45	1557		
7/18	6	-2	0	0	2	4	*8	0	2	6	0	2	0	8	14	0	4	4	-2	56	3.46	1613		
TOTAL	65	87	111	76	78	93	\$442	50	63	40	46	48	30	57	67	68	44	72	76	1613	100			
%	4.03	5.39	6.88	4.71	4.84	5.77	27.40	3.10	3.91	2.48	2.85	2.98	1.86	3.53	4.15	4.22	2.73	4.46	4.71	4.71	100	1613		

Note: * denotes interpolated value.
- denotes downstream counts.

Appendix Table 1. Daily total cumulative chinook salmon escapement,
North River tower.

Date	1972 1/	1973 1/	1974 2/	1984 3/	1985 3/	1986
6/25			0	0		0
6/26			0	0		2
6/27			1	0	0	2
6/28			3	0	0	2
6/29		1	6	55	0	8
6/30		1	42	101	0	42
7/01		1	48	513	0	116
7/02		6	53	642	0	158
7/03		10	88	745	0	198
7/04		16	125	984	0	326
7/05		19	151	1038	1	338
7/06		20	173	1207	35	438
7/07	11	22	184	1274	34	609
8/08	15	26	191	1341	34	731
8/09	30	33	191	1367	34	827
7/10	50	43	192	1418	34	953
7/11	126	71	192	1648	32	1167
7/12	172	82	192	1957	33	1230
7/13	194	83	193	2126	39	1294
7/14	245	87	196	2242	71	1364
7/15	309	94	196	2358	126	1446
7/16	376	97	196	2481	213	1518
7/17	406	119	196	2602	260	1557
7/18	458	150		2674	314	1613
7/19	466	150		2706	366	
7/20	475	216		2784	563	
7/21	492	231		2803	635	
7/22	508	262		2825	748	
7/23	521	298		2847	824	
7/24	535			2845	958	
7/25	544			2840	1093	
7/26	551			2844	1168	
7/27	556			2848	1213	
7/28	561			2844	1266	
7/29					1300	
7/30					1322	
7/31					1328	
8/01					1341	
8/02					1356	
8/03					1366	
8/04					1381	
8/05					1382	
8/06					1392	
8/07					1397	
8/08					1414	
8/09					1418	
8/10					1423	
8/11					1427	
8/12					1429	
8/13					1429	
8/14					1432	
8/15					1428	
8/16					1428	
8/17					1425	
8/18					1424	
8/19					1424	
8/20					1425	
8/21					1426	

1/ 24 hour counts

2/ 18 hour counts

3/ expanded counts

Appendix Table 2. Daily total cumulative pink salmon escapement,
North River tower.

Date	1972 1/	1973 1/	1974 2/	1984 3/	1985 3/	1986
6/25			111	27		0
6/26			371	27		20
6/27			2410	379	0	42
6/28			5366	4201	0	542
6/29	0	14140	30301	0	0	3162
6/30	0	36909	70057	0	0	10648
7/01	49	49445	141035	0	0	18685
7/02	83	59699	175065	0	0	44335
7/03	187	85613	213513	0	0	70567
7/04	539	108778	244864	0	0	120907
7/05	1004	120023	255068	0	0	136727
7/06	1196	131573	261472	0	0	157516
7/07	3790	1394	141361	267837	0	170730
7/08	11743	1504	143621	274201	0	179083
7/09	18374	1931	143692	276696	0	185913
7/10	23589	3276	143724	283051	0	195468
7/11	30323	6925	143764	293200	11	202944
7/12	34836	10115	143764	303493	13	208597
7/13	39428	12265	143772	315069	23	213705
7/14	42550	16510	143777	330354	79	217106
7/15	46046	19384	143783	345473	135	219354
7/16	49000	20028	143785	368228	201	228168
7/17	50801	21094	143789	400054	250	231798
7/18	52079	22192		417711	407	236487
7/19	52303	23205		426787	753	
7/20	52512	24323		438645	1350	
7/21	52956	25265		440167	1591	
7/22	53409	25976		444602	1917	
7/23	53965	26542		449037	2179	
7/24	54320			451423	2439	
7/25	54545			453398	2701	
7/26	54710			455204	2924	
7/27	54763			456875	3159	
7/28	54934			458387	3301	
7/29					3431	
7/30					3534	
7/31					3627	
8/01					3704	
8/02					3783	
8/03					3940	
8/04					4009	
8/05					4052	
8/06					4112	
8/07					4135	
8/08					4158	
8/09					4228	
8/10					4269	
8/11					4284	
8/12					4295	
8/13					4322	
8/14					4322	
8/15					4330	
8/16					4334	
8/17					4337	
8/18					4337	
8/19					4344	
8/20					4351	
8/21					4351	
8/22					4349	
8/23					4350	
8/24					4354	
8/25					4355	
8/26					4356	
8/27					4357	
8/28					4358	
8/29					4359	
8/30					4360	
8/31					4360	

1/ 24 hour counts

2/ 18 hour counts

3/ expanded counts

**Appendix Table 3. Daily cumulative chum salmon escapement,
North River tower.**

Date	1972 1/	1973 1/	1974 2/	1984 3/	1985 3/	1986
6/25			0	0		0
6/26			0	1		0
6/27			19	1	0	0
6/28			23	1	0	14
6/29		0	33	88	0	82
6/30		0	91	124	0	308
7/01		9	177	320	0	562
7/02		9	217	395	0	784
7/03		19	369	431	0	999
7/04		59	533	489	0	1439
7/05		72	633	511	0	1485
7/06		79	717	533	15	1668
7/07	96	88	751	551	20	1792
7/08	215	96	769	570	23	1921
7/09	272	121	776	579	25	2011
7/10	344	288	776	600	25	2251
7/11	548	681	776	675	38	2485
7/12	687	891	776	776	52	2655
7/13	777	1041	780	952	364	2807
7/14	958	1545	793	1184	458	2953
7/15	1114	2144	798	1437	573	3158
7/16	1418	2190	810	1531	633	3552
7/17	1696	2436	826	1895	694	3628
7/18	1742	2666		2072	826	3738
7/19	1742	3087		2150	1077	
7/20	1754	3310		2461	1730	
7/21	1859	3546		2572	1834	
7/22	1990	3798		2692	1985	
7/23	2119	4334		2812	2126	
7/24	2204			2846	2276	
7/25	2241			2870	2413	
7/26	2268			2896	2539	
7/27	2285			2908	2643	
7/28	2332			2915	2733	
7/29					3129	
7/30					3261	
7/31					3353	
8/01					3526	
8/02					3638	
8/03					3750	
8/04					3839	
8/05					3959	
8/06					4040	
8/07					4098	
8/08					4129	
8/09					4176	
8/10					4212	
8/11					4265	
8/12					4301	
8/13					4326	
8/14					4362	
8/15					4366	
8/16					4377	
8/17					4406	
8/18					4425	
8/19					4457	
8/20					4472	
8/21					4473	
8/22					4480	
8/23					4488	
8/24					4499	
8/25					4512	
8/26					4520	
8/27					4526	
8/28					4531	
8/29					4537	
8/30					4550	
8/31					4567	

1/ 24 hour counts

2/ 18 hour counts

3/ expanded counts

Appendix Table 4. Peak annual aerial surveys, North River, 1962-1985.

Year	Chinook	Chum	Pink	Pink and Chum	Coho
1962	162			16087	
1963 1/	287			73274	
1964	23			5981	
1965	153			16600	
1970 1/	1	20655	12400		
1971 1/	256			1047	
1973	267	3644	16590		
1975 1/	60	5237	17885		
1976 1/	66	196	10606		
1977	1275	8139	4565		
1978	321	9349	21813		
1979	735	1130	9500		
1980	61	2300	127900		204
1981	68	405	575		263
1982	8	599	173352		4145
1983	347	4135	4980		
1984	51				152
1985	703	1625	325		

1/ Poor survey conditions or partial survey.